

REMARKS

The following remarks are provided in response to the Office Action mailed April 6, 2006 in which the Examiner:

- rejected claims 1, 8-10 and 18-19 under 35 U.S.C. §102(e) as being anticipated by US 2004/0110387 to Chowdhury (hereinafter Chowdhury).
- rejected claims 2-5, 11-12 and 14-15 under 35 U.S.C. §103(a) as being unpatentable over Chowdhury.
- rejected claims 6 and 16 under 35 U.S.C. §103(a) as being unpatentable over Chowdhury in view of US 2005/0085090 to Mui et al. (hereinafter Mui).
- rejected claim 13 under 35 U.S.C. §103(a) as being unpatentable over Chowdhury in view of US 6,509,237 to Wang et al. (hereinafter Wang).
- rejected claims 7 and 17 under 35 U.S.C. §103(a) as being unpatentable over Chowdhury in view of US 2004/0209476 to Ying et al. (hereinafter Ying).

The applicants respectfully request reconsideration of the above referenced patent application for the following reasons:

Claim 1, 8-10 and 18-19 rejection under 35 U.S.C. §102(e)

Claims 1, 8-10 and 18-19 are rejected under 35 U.S.C. §102(e) as being anticipated by Chowdhury. The applicants herein amend independent claims 1 and 10 (upon which claims 8-9 and 18-19, respectively, depend) and respectfully request reconsideration of claims 1, 8-10 and 18-19 in view of the amendments and the following arguments.

With respect to claims 1 and 10, the applicants teach and claim a method of forming a thin film stack or a flash memory gate stack on a substrate. A hardmask layer comprising a carbon based material is formed on the thin film stack or on the flash memory gate stack (claims 1 or 10, respectively). An anti-reflective coating (ARC) layer comprising a different material than the hardmask layer is formed on the hardmask layer. A resist layer comprising a carbon-based material is formed on the ARC layer. The resist layer and the ARC layer are then patterned and the hardmask layer is etched using the patterned ARC layer as a mask. A portion of the resist layer is removed during the etching of the hardmask layer. The thin film stack or the flash memory gate stack is then etched using the hardmask layer as a mask. That is, the applicants teach a method to pattern a thin film stack or a flash memory gate stack using a resist layer, an ARC layer and a hardmask, wherein **the hardmask and the resist layer are both comprised of a carbon based material and so a portion of the resist layer is removed during the etching of the hardmask layer.**

Chowdhury fails to disclose a method to pattern a thin film stack or a flash memory gate stack using a resist layer, an ARC layer and a hardmask, wherein the hardmask and the resist layer are both comprised of a carbon based material and a portion of the resist layer is removed during the etching of the hardmask layer. Chowdhury does disclose etching a gate layer **105** (Fig. 8) to form a patterned gate layer **110** (Fig. 9) **using a patterned photo-resist 210 and a hardmask formed from a patterned etch-stop layer 145 coupled with a patterned metallic layer 130** (Fig. 8, p. 3 [0028]). The etch-stop layer **145** is a nitride layer (p. 2 [0022]) and the patterned metallic layer **130** contains

a variety of metal-containing materials (p. 2 [0020]) and, therefore, the hardmask does not comprise a carbon based material. The photo-resist layer **210** is removed in a separate step (p. 3 [0029]) and, so, Chowdhury does not enable removing a portion of a photo-resist layer during the etching/patterning of a hardmask. Thus, **Chowdhury discloses patterning a gate layer with a hardmask that includes a nitride etch-stop layer and a metallic layer** whereas **the applicants teach patterning a thin film stack or a flash memory gate stack with a hardmask and a resist layer that comprise carbon based materials, enabling removal of a portion of the resist layer during the etching of the hardmask layer.**

Claims 2-5, 11-12 and 14-15 rejection under 35 U.S.C. §103(a)

Claims 2-5, 11-12 and 14-15 are dependent on independent claims 1 and 10. In view of amended independent claims 1 and 10 discussed above, the applicants request that claims 2-5, 11-12 and 14-15 be reconsidered.

Claims 6 and 16 rejection under 35 U.S.C. §103(a)

Claims 6 and 16 are dependent on independent claims 1 and 10, respectively. In view of amended independent claims 1 and 10 discussed above, the applicants request that claims 6 and 16 be reconsidered.

Claim 13 rejection under 35 U.S.C. §103(a)

Claim 13 is dependent on independent claim 10. In view of amended independent

claim 10 discussed above, the applicants request that claim 13 be reconsidered.

Claims 7 and 17 rejection under 35 U.S.C. §103(a)

Claims 7 and 17 are dependent on independent claims 1 and 10, respectively. In view of amended independent claims 1 and 10 discussed above, the applicants request that claims 7 and 17 be reconsidered.

New Claims 31-38

In new claims 31-38, the applicants teach and claim a method of forming a thin film stack above a first dielectric layer on a substrate. The thin film stack comprises a second dielectric layer between two polysilicon layers. A hardmask layer is formed on the thin film stack and an anti-reflective coating (ARC) layer comprising a different material than the hardmask layer is formed on the hardmask layer. The ARC layer is patterned and the hardmask layer is etched using the patterned ARC layer as a mask. The thin film stack is then etched using the hardmask layer as a mask. The patterned ARC layer is completely removed during the etching of the second dielectric layer between the two polysilicon layers of the thin film stack. That is, the applicants teach a method to pattern a thin film stack using an ARC layer and a hardmask, wherein the ARC layer is removed during the etching of a dielectric layer that is between two polysilicon layers in the thin film stack.

With respect to claims 31-38, none of Chowdhury, Mui, Wing nor Yang disclose a method to pattern a thin film stack using an ARC layer and a hardmask, wherein the

ARC layer is removed during the etching of a dielectric layer that is between two polysilicon layers in the thin film stack, as taught by the applicants.

CONCLUSION

The applicants submit that they have overcome the Examiner's rejections of the claims and that they have the right to claim the invention as set forth in the listed claims. The Examiner is respectfully requested to contact the undersigned by telephone if it is believed that such contact would further the examination of the present application.

Pursuant to 37 C.F.R. 1.136(a)(3), applicant(s) hereby request and authorize the U.S. Patent and Trademark Office to (1) treat any concurrent or future reply that requires a petition for extension of time as incorporating a petition for extension of time for the appropriate length of time and (2) charge all required fees, including extension of time fees and fees under 37 C.F.R. 1.16 and 1.17, to Deposit Account No. 02-2666.

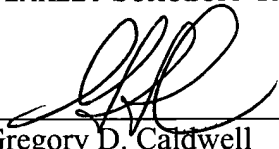
Respectfully submitted,

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Dated

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